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ABSTRACT

This teacher guide is part of the materials prepared for an individualized program for ninth-grade algebra and basic mathematics students. Materials written for the program are to be used with audiovisual lessons recorded on tape cassettes. For an evaluation of the program, see ED 086 545. In this guide, the teacher is provided with objectives for each topic area and guided to materials written for a given topic. Three short criterion tests are included for each topic covered. Work in this package includes converting fractions and decimals to percent and back to decimals. Practical application problems dealing with discounts and commissions are presented. This work was prepared under an ESEA Title III contract. (JP)

In package 01-09 you will learn how to solve applied problems dealing with percent. You will probably want to know how to solve percentage problems many times in your life. When you borrow money you must pay back more than you borrowed. The extra money you must pay back is called interest. In order to know if you are being charged more interest than you should be, you would need to solve a percentage problem.

Many people buy a home, a car, a farm, etc. with a down payment and a series of installment payments. It is difficult to find out if the carrying charges and interest are too high without solving a percentage problem.

Commissions, discounts, grades on school papers, taxes and many other applications require the use of percentage.

The Goal of this package:

For you to understand percent well enough so that you can use it to solve the kind of problems you are likely to encounter.

PACKAGE OBJECTIVES:

1. Given a decimal numeral or a fractional numeral convert it to a percent and conversely.

2. Given a percent problem, translate it into a number sentence and solve that sentence.

3. Given an applied problem in percent solve it.

4. Given an applied problem involving percent and taxes, solve it.

5. Given an applied problem dealing with commission or discount, solve it.

6. Given an interest problem, solve it.

IMPORTANT

This package has proved to be the most difficult of the basic math I packages. For this reason there are two sets of video tapes for this package. The first set teaches the same method that is taught in the textbook. If you prefer to use this set, you ask for the tape by unit number followed by "method 1".

We feel that method 2 is easier and more in harmony with your math background. Therefore, we suggest that you ignore the instruction in the textbook and simply ask for "method 2" video tapes. You can still use the problems in your textbook for practice.

I. U. # 01-09-01

The Percent Symbol

OBJECTIVES:

1. When asked to tell the meaning of the percent symbol, write "The % symbol means 'per hundred'".

2. When asked to tell the meaning of a percent numeral such as 45%, write "45% means 45 x .01 or 45 x $\frac{1}{100}$ or $\frac{45}{100}$."

3. Given a decimal numeral or a fractional numeral, convert it to a percent numeral and conversely. (The converse means "reversed in order". Therefore the converse of objective 3 would be "Given a percent numeral, convert it to a decimal numeral or a fractional numeral.)

ACTIVITIES:

1. Study pages 257 - 261 and do margin exercises. (Objectives 1, 2, 3)

2. Write the odd problems, exercise set 1, pages 277, 278.

Criterion Test 01-09-01-01

1. What does the % symbol mean?

2. What does 63% mean?

3. Convert to a percent numeral.

   (a) .43 (b) $\frac{11}{12}$

   Convert to a decimal numeral.

   (c) 73% (d) 75%

   Convert to a fractional numeral.

   (e) 73% (f) 75%

Criterion Test 01-09-01-02

1. What does the % symbol mean?

2. What does 23% mean?

3. Convert to a percent numeral.

   (a) .35 (b) $\frac{3}{8}$

   Convert to a decimal numeral.

   (c) 15% (d) 80%

   Convert to a fractional numeral.

   (e) 15% (f) 80%

Criterion Test 01-09-01-03

1. What does the % symbol mean?

2. What does 75% mean?

3. Convert to a percent numeral.

   (a) .75 (b) $\frac{14}{21}$

   Convert to a decimal numeral.

   (c) 35% (d) 14%

   Convert to a fractional numeral.

   (e) 35% (f) 14%

Answers to Criterion Tests

Test 01-09-01-01

1. The % symbol means "per hundred".

2. 63% means 63 x .01 or 63 x $\frac{1}{100}$ or $\frac{63}{100}$

3. (a) 43% (b) 91.6% or 92%

   (c) .73 (d) .75

   (e) $\frac{73}{100}$ (f) $\frac{75}{100}$ in simplest form $\frac{3}{4}$

Test 01-09-01-02

1. The % symbol means "per hundred".

2. 23% means 23 x .01 or 23 x $\frac{1}{100}$ or $\frac{23}{100}$

3. (a) 35% (b) 37.5%

   (c) .15 (d) .80

   (e) $\frac{15}{100}$ or $\frac{3}{20}$ (f) $\frac{80}{100}$ or $\frac{4}{5}$

Test 01-09-01-03

1. The % symbol means "per hundred".

2. 75% means 75 x .01 or 75 x $\frac{1}{100}$ or $\frac{75}{100}$

3. (a) 75% (b) 66.7% or 67%

   (c) .35 (d) .14

   (e) $\frac{35}{100}$ or $\frac{7}{20}$ (f) $\frac{14}{100}$ or $\frac{7}{50}$

I. U. # 01-09-02

Using Number Sentences With Percent

OBJECTIVES:

1. Given a percent problem, translate it into a number sentence and solve it.

2.

ACTIVITIES:

1. Study pages 262 - 264 and write the margin exercises. (Objective 1)

2. Write exercise set 2, odd problems, pages 279, 280. (Objective 1)

Criterion Test 01-09-02-01

1. Translate into a number sentence and solve the sentence.

   (a) How much is 37% of 45?

   (b) 75 is what percent of 85?

   (c) 15% of what is 25?

   (d) 75 is what percent of 25?

Criterion Test 01-09-02-02

1. Translate into a number sentence and solve the sentence.

   (a) 25 is what percent of 50?

   (b) 15% of what is 125?

   (c) What is 8.5% of 5000?

   (d) 80 is what percent of 20?

Criterion Test 01-09-02-03

1. Translate into a number sentence and solve it.

   (a) What is 9% of 250 ?

   (b) 50 is what percent of 22?

   (c) 12% of what is 144?

   (d) 2.5% of 45 is what?

Answers to Criterion Tests

Test 01-09-02-01

1. (a) $x = 37\% \cdot 45$ or $\frac{37}{100} = \frac{x}{45}$ $x = 16.65$

   (b) $75 = x\% \cdot 85$ or $\frac{x}{100} = \frac{75}{85}$ $x = 88\%$ (to nearest whole percent)

   (c) $15\% \cdot x = 25$ or $\frac{15}{100} = \frac{25}{x}$ $x = 167$ (to the nearest whole number)

   (d) $75 = x\% \cdot 25$ or $\frac{x}{100} = \frac{75}{25}$ $x = 300\%$

Test 01-09-02-02

1. (a) $25 = x\% \cdot 50$ or $\frac{x}{100} = \frac{25}{50}$ $x = 50\%$

   (b) $15\% \cdot x = 125$ or $\frac{15}{100} = \frac{125}{x}$ $x = 833$ (to the nearest whole number)

   (c) $x = 8.5\% \cdot 5000$ or $\frac{8.5}{100} = \frac{x}{5000}$ $x = 425$

   (d) $80 = x\% \cdot 20$ or $\frac{x}{100} = \frac{80}{20}$ $x = 400\%$

Test 01-09-02-03

1. (a) $x = 9\% \cdot 250$ or $\frac{9}{100} = \frac{x}{250}$ $x = 22.50$

   (b) $50 = x\% \cdot 22$ or $\frac{x}{100} = \frac{50}{22}$ $x = 227\%$ (to the nearest whole percent)

   (c) $12\% \cdot x = 144$ or $\frac{12}{100} = \frac{144}{x}$ $x = 1,200$

   (d) $2.5\% \cdot 45 = x$ or $\frac{2.5}{100} = \frac{x}{45}$ $x = 1.125$

I. U. # 01-09-03

Some Applied Problems Involving Percent

OBJECTIVES:

1. Given an applied problem in percent, solve it.

ACTIVITIES:

1. Study pages 256, 257 and do the margin exercises on those pages. (Objective 1)

2. Write exercise set 3, odd problems, pages 281, 282. (Objective 1)

Criterion Test 01-09-03-01

1. Solve.

   (a) 50% of the students in Arnold High School are above average science students. If there are 150 students in Arnold High school, how many of them are above average in science?

   (b) John weighed a block of wood and found that it weighed 45.8 Newtons to the nearest tenth of a Newton. If the correct weight is 50.0 Newtons to the nearest tenth, what is John's percent of error in the weighing?

   (c) If a shirt marked $5.50 is to be reduced 10% in price for a sale, how much will it be reduced?

Criterion Test 01-09-03-02

1. Solve.

   (a) If a man owns 75 head of cattle and expects to have a 3% death loss each year, about how many head of cattle does he expect to die each year?

   (b) If a store owner plans to sell his merchandise for 10% more than he pays for it, how much more will he receive for a $15.00 item than he paid for it?

   (c) If a one pound package of meat is mis-weighed and you are charged for 1.25 pounds of meat, what percent have you been overcharged?

Criterion Test 01-09-03-03

1. Solve.

   (a) A test has 28 questions on it. If you miss three questions what percent of the questions did you miss? (to the nearest tenth)

   (b) If I weighed 10% more than I do now, I would weigh 20 pounds more. How much do I weigh now?

   (c) A store has a sale and marks everything down 20%. If the sale price of a pair of shoes is $2.00 less than it was, what was the original price?

Answers to Criterion Tests

Test 01-09-03-01

1. (a) 75 (b) 8.4% (c) $.55 or 55¢

Test 01-09-03-02

1. (a) about 2 head (to the nearest head)

(b) $1.50 (b) 25%

Test 01-09-03-03

1. (a) 10.7% (b) 200 pounds (c) $10.00

I. U. # 01-09-04

Taxes

01-09-04

OBJECTIVES:

1. Given an applied problem in percent and taxes, solve it.

ACTIVITIES:

1. Study pages 268 - 272 and do the margin exercises on those pages. (Objective 1)

2. Do the odd numbered exercises in Exercise Set 4 pages 283, 284. (Objective 1)

Criterion Test 01-09-04-01

1. Solve.

   (a) The sales tax rate in Nebraska is 2.5%. How much sales tax must be paid on a $4,000.00 car?

   (b) If the sales tax rate is 2.5% and the tax on an item is $10.00, how much was the cost of the item purchased.

   (c) Hugh Merist, the comedian, made $10,000 in one week in Las Vegas. His tax rate is 55%. How much of the $10,000 will he have after paying his income tax?

Criterion Test 01-09-04-02

1. Solve.

   (a) A man's adjusted gross income was $3975. He was to pay tax as follows: $450 plus 17% of the amount which exceeds 3000.00. To the nearest cent, how much were his taxes?

   (b) The sales tax on a car is $168.00. The sales tax rate is 2.5%. How much was the cost of the car?

   (c) A man earned $9000 salary in one year. He pays 25% of his income for income tax. How much does he pay?

Criterion Test 01-09-04-03

1. Solve.

   (a) A fur coat cost $500 plus $15 sales tax. What is the tax rate on the coat?

   (b) U. R. Stuck paid $1800.00 income tax. This was 18% of Stuck's income. How much was his income?

   (c) If the sales tax on a car is $2\frac{1}{2}\%$ of the $3000.00 that it cost, how much is the sales tax?

Answers to Criterion Tests

Test 01-09-04-01

1. (a) $100.00 (b) $400.00 (c) $4,500.00

Test 01-09-04-02

1. (a) $615.75 (b) $6,720.00 (c) $2,250.00

Test 01-09-04-02

1. (a) 3% (b) $10,000.00 (c) $75.00

I.U. #01-09-05

COMMISSION AND DISCOUNT

OBJECTIVE:

Given an applied problem dealing with commission or discount, solve it.

ACTIVITIES:

1. Study pages 271 and 272, and do the margin exercises on those pages. (Objective 1)

2. Write the exercise set 5, odd problems, pages 285-286. (Objective 1)

CRITERION TESTS

Criterion Test 01-09-05-01

1. Solve:
   (a) If a salesman's commission is 20% and he sells $16,500 worth of merchandise, how much is his commission?

   (b) A life insurance salesman gets a salary of $250 per month plus 5% of his sales. If he sells insurance that costs $10,000 in one month, what will his total income for that month be?

   (c) If an item is marked at $500 before a 20% discount is allowed, what would the sale price be?

Criterion Test 01-09-05-02

1. Solve:
   (a) If an item has a 25% discount and the discount is $5 what was the original price?

   (b) What was the sale price?

   (c) If a salesman gets a commission of 4% on the first $2000 of sales and 8% on all sales over $2000 in a calendar month, how much would he make if he had $2575 worth of sales in one month?

Criterion Test 01-09-05-03

1. Solve:
   (a) If an item sold with a 10% discount for $180, what was the original marked price?

   (b) How much was the discount?

   (c) If a salesman sells $2400 worth of merchandise and receives a $120 commission, what rate of commission does he recieve?

ANSWERS TO CRITERION TESTS

Criterion Test 01-09-05-01

1. (a) $3,300

   (b) $750

   (c) $400

Criterion Test 01-09-05-02

1. (a) $20

   (b) $15

   (c) $126

Criterion Test 01-09-05-03

1. (a) $200

   (b) $20

   (c) 5 %

I.U. #01-09-06

INTEREST

OBJECTIVES:

1. When asked to write the formula for simple interest, write "I = P·R·T.

2. When asked to define compound interest, write, "Interest paid not only on the principal, but also on the interest which has been added to the principal, is called compound interest."

3. Given in interest problem, solve it.

ACTIVITIES:

1. Study objective 1 until you know the formula. (Objective 1)

2. Study page 273-274, AAMA, until you understand how to use the formula. Do margin exercises 63-66. (Objective 3)

3. Study objective 2 until you know the definition. (Objective 2)

4. Study pages 275-276 until you understand how to work compound interest problems. (Objective 3)

5. Study page 274 until you understand how to compute interest and remaining principal on installment purchases.

6. Do exercise set 6, odd problems, pages 287-289. (Objective 3)

CRITERION TESTS

Criterion Test 01-09-06-01

1. Write the formula for simple interest.

2. Write the definition of compound interest.

3. Solve:
   (a) What is the simple interest on $2000 at 9% interest for 90 days. (Round to nearest cent.)

   (b) Find the amount of interest on $1,000.00 at 6% after three years if the interest is compounded annually. (Round to nearest cent.)

Criterion Test 01-09-06-02

1. Write the formula for simple interest.

2. Write the definition of compound interest.

3. Solve:
   (a) Find the simple interest on $400 at 8½% for 30 days. (Round to the nearest cent.)

   (b) Find the compound interest on $400 at 5% compounded semi-annually for one year. (Round to the nearest cent.)

Criterion Test 01-09-06-03

1. Write the formula for simple interest.

2. Write the definition of compound interest.

3. Solve:
   (a) Find the simple interest on $2000 at 7% interest for three years. (Round to the nearest cent.

   (b) Find the interest on $800 at 7% compounded annually for two years. (Round to the nearest cent.)

ANSWERS TO CRITERION TESTS

Criterion Test 01-09-06-01

1. $I = P \cdot R \cdot T$

2. Interest paid not only on the principal but also on the interest which has been added to the principal is called compound interest.

3. (a) $45 (b) $191.02

Criterion Test 01-09-06-02

1. $I = P \cdot R \cdot T$

2. Interest paid not only on the principal but also on the interest which has been added to the principal is called compound interest.

3. (a) $2.83 (b) $20.25

Criterion Test 01-09-06-03

1. $I = P \cdot R \cdot T$

2. Interest paid not only on the principal but also on the interest which has been added to the principal is called compound interest.

3. (a) $420 (b) $115.92

THE END
Package 01-09